

KARL PEARSON.

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UNIVERSITY OF LONDON, UNIVERSITY COLLEGE

QUESTIONS OF THE DAY AND OF THE FRAY
No. X

THE SCIENCE OF MAN

ITS NEEDS AND ITS PROSPECTS

By KARL PEARSON, F.R.S.

*Being the Presidential Address to Section H of the British
Association for the Advancement of Science,
Cardiff, 1920*

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THE SCIENCE OF MAN

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*Being the Presidential Address to Section H of the
British Association for the Advancement of Science,
Cardiff 1920.*

Anthropology—the Understanding of Man—should be, if Pierre Charron were correct, the true science and the true study of mankind.¹ We might anticipate that in our days—in this era of science—anthropology in its broadest sense would occupy the same exalted position that theology occupied in the Middle Ages. We should hail it ‘Queen of the Sciences,’ the crowning study of the academic curriculum. Why is it that we are Section H and not Section A? If the answer be given that such is the result of historic evolution, can we still be satisfied with the position that anthropology at present takes up in our British Universities and in our learned societies? Have our universities, one and all, anthropological institutes well filled with enthusiastic students, and are there brilliant professors and lecturers teaching them not only to understand man’s past, but to use that knowledge to forward his future? Have we men trained during a long life of study and research to represent our science in the arena, or do we largely trust to dilettanti—to retired civil servants, to untrained travellers or colonial medical men for our knowledge, and to the anatomist, the surgeon, or the archæologist for our teaching? Needless to say, that for the study of man we require the better part of many sciences, we must draw for contributions on medicine, on zoology, on anatomy, on archæology, on folk-lore and travel-lore, nay, on history, psychology, geology, and many other branches of knowledge. But a hotch-potch of the facts of these sciences does not create anthropology. The true anthropologist is not the man who has merely a wide knowledge of the conclusions of other sciences, he is the man who grasps their bearing on mankind and throws light on the past and present factors of human evolution from that knowledge.

¹ “La vraie science et le vrai estude de l’homme c’est l’Homme.” Pierre Charron, *De la Sagesse*, Préface du Premier Livre, 1601. Pope, with his “The proper study of mankind is Man,” 1733, was, as we might anticipate, only a plagiarist.

I am afraid I am a scientific heretic—an outcast from the true orthodox faith—I do not believe in science for its own sake. I believe only in science for man's sake. You will hear on every side the argument that it is not the aim of science to be utile, that you must pursue scientific studies for their own sake and not for the utility of the resulting discoveries. I think that there is a great deal of obscurity about this attitude, I will not say nonsense. I find the strongest supporters of 'science for its own sake' use as the main argument for the pursuit of not immediately utile researches that these researches will be useful some day, that we can never be certain when they will turn out to be of advantage to mankind. Or, again, they will appeal to non-utile branches of science as providing a splendid intellectual training—as if the provision of highly trained minds was not itself a social function of the greatest utility! In other words, the argument from utility is in both cases indirectly applied to justify the study of science for its own sake. In the old days the study of hyperspace—space of higher dimensions than that of which we have physical cognisance—used to be cited as an example of a non-utile scientific research. In view of the facts: (i.) that our whole physical outlook on the universe—and with it I will add our whole philosophical and theological outlooks—are taking new aspects under the theory of Einstein; and (ii.) that study of the relative influences of Nature and Nurture in Man can be reduced to the trigonometry of polyhedra in hyperspace—we see how idle it is to fence off any field of scientific investigation as non-utile.

Yet are we to defend the past of anthropology—and, in particular, of anthropometry—as the devotion of our science to an immediate non-utile which one day is going to be utile in a glorious and epoch-making manner, like the Clifford-Einstein suggestion of the curvature of our space? I fear we can take no such flattering unction to our souls. I fear that 'the best is yet to be' cannot be said of our multitudinous observations on 'height-sitting' or on the censuses of eye or hair colours of our population. These things are dead almost from the day of their record. It is not only because the bulk of their recorders were untrained to observe and measure with scientific accuracy, it is not only because the records in nine out of ten cases omit the associated factors without which the record is valueless. It is because the progress of mankind in its present stage depends on characters wholly different from those which have so largely occupied the anthropologist's attention. Seizing the superficial and easy to observe, he has let slip the more subtle and elusive qualities on which progress, on which national fitness for this or that task essentially depends. The pulse-tracing, the reaction-time, the mental age of the men under his control are far more important to the commanding officer—nay, I will add, to the employer of labour—than any record of span, of head-measurement, or pigmentation categories. The psycho-physical and psycho-physiological characters are of far greater weight in the struggle of nations to-day than the superficial measurements of man's body. Physique, in the fullest sense, counts something still, but it is physique as measured by health, not by stature or eye-colour. But character, strength of will, mental quickness count more, and if anthropometry

is to be useful to the State it must turn from these rusty old weapons, these measurements of stature and records of eye-colour to more certain appreciations of bodily health and mental aptitude—to what we may term 'vigorimetry' and to psychometry.

Some of you may be inclined to ask: And how do you know that these superficial size-, shape-, and pigment-characters are not closely associated with measurements of soundness of body and soundness of mind? The answer to this question is twofold, and I must ask you to follow me for a moment into what appears a totally different subject. I refer to a 'pure race.' Some biologists apparently believe they can isolate a pure race, but in the case of man, I feel sure that purity of race is a merely relative term. For a given character one race is purer than a second, if the scientific measure of variation of that character is less than it is in the second. In loose wording, for we cannot express ourselves accurately without mathematical symbols, that race is purer for which on the average the individuals are closer to type for the bulk of ascertainable characters than are the characters in a second race. But an absolutely pure race in man defies definition. The more isolated a group of men has remained, the longer it has lived under the same environment, and the more limited its habitat, the less variation from type it will exhibit, and we can legitimately speak of it as possessing greater purity. We, most of us, probably believe in a single origin of man. But as anthropologists we are inclined to speak as if at the dawn of history there were a number of pure races, each with definite physical and mental characteristics; if this were true, which I do not believe, it could only mean that up to that period there had been extreme isolation, extremely differentiated environments, and so marked differences in the direction and rate of mental and physical evolution. But what we know historically of folk-wanderings, folk-mixings, and folk-absorptions have undoubtedly been going on for hundreds of thousands of years, of which we know only a small historic fragment. Have we any real reason for supposing that 'purity of race' existed up to the beginning of history, and that we have all got badly mixed up since?

Let us, however, grant that there were purer races at the beginning of history than we find to-day. Let us suppose a Nordic race with a certain stature, a given pigmentation, a given shape of head, and a given mentality. And, again, we will suppose an Alpine race, differing markedly in type from the Nordic race. What happens if we cross members of the two races and proceed to a race of hybrids? A Mendelian would tell us that these characters are sorted out like cards from a pack in all sorts of novel combinations. A Nordic mentality will be found with short stature and dark eyes. A tall but brachycephalic individual will combine Alpine mentality with blue eyes. Without accepting fully the Mendelian theory we can at least accept the result of mass observations, which show that the association between superficial physical measurements and mentality is of the slenderest kind. If you keep within one class, my own measurements show me that there is only the slightest relation between intelligence and the size and shape of the head. Pigmentation in this country seems

to have little relation to the incidence of disease. Size and shape of head in man have been taken as a rough measure of size and shape of brain. They cannot tell you more—perhaps not as much as brain-weight—and if brain-weight were closely associated with intelligence, then man should be at his intellectual prime in his teens.

Again, too often is this idea of close association of mentality and physique carried into the analysis of individuals within a human group, *i.e.* of men belonging to one or another of the many races which have gone to build up our population. We talk as if it was our population which was mixed, and not our germplasm. We are accustomed to speak of a typical Englishman. For example, Charles Darwin; we think of his mind as a typical English mind, working in a typical English manner, yet when we come to study his pedigree we seek in vain for 'purity of race.' He is descended in four different lines from Irish kinglets; he is descended in as many lines from Scottish and Pictish kings. He had Manx blood. He claims descent in at least three lines from Alfred the Great, and so links up with Anglo-Saxon blood, but he links up also in several lines with Charlemagne and the Carolingians. He sprang also from the Saxon Emperors of Germany, as well as from Barbarossa and the Hohenstaufens. He had Norwegian blood and much Norman blood. He had descent from the Dukes of Bavaria, of Saxony, of Flanders, the Princes of Savoy, and the Kings of Italy. He had the blood in his veins of Franks, Alamans, Merovingians, Burgundians, and Longobards. He sprang in direct descent from the Hun rulers of Hungary and the Greek Emperors of Constantinople. If I recollect rightly, Ivan the Terrible provides a Russian link. There is probably not one of the races of Europe concerned in the folk-wanderings which has not a share in the ancestry of Charles Darwin. If it has been possible in the case of one Englishman of this kind to show in a considerable number of lines how impure is his race, can we venture to assert that if the like knowledge were possible of attainment, we could expect greater purity of blood in any of his countrymen? What we are able to show may occur by tracing an individual in historic times, have we any valid reason for supposing did not occur in prehistoric times, wherever physical barriers did not isolate a limited section of mankind? If there ever was an association of definite mentality with physical characters, it would break down as soon as race mingled freely with race, as it has done in historic Europe. Isolation or a strong feeling against free inter-breeding—as in a colour differentiation—could alone maintain a close association between physical and mental characters. Europe has never recovered from the general hybridisation of the folk-wanderings, and it is only the cessation of wars of conquest and occupation, the spread of the conception of nationality and the reviving consciousness of race, which is providing the barriers which may eventually lead through isolation to a new linking-up of physical and mental characters.

In a population which consists of non-intermarrying castes, as in India, physique and external appearance may be a measure of the type of mentality. In the highly and recently hybridised nations of Europe there are really but few fragments of 'pure races' left, and it is

hopeless to believe that anthropometric measurements of the body or records of pigmentation are going to help us to a science of the psychophysical characters of man which will be useful to the State. The modern State needs in its citizens vigour of mind and vigour of body, but these are not characters with which the anthropometry of the past has largely busied itself. In a certain sense the school medical officer and the medical officer of health are doing more State service of an anthropological character than the anthropologists themselves.

These doubts have come very forcibly to my notice during the last few years. What were the anthropologists as anthropologists doing during the war? Many of them were busy enough and doing valuable work because they were anatomists, or because they were surgeons, or perhaps even because they were mathematicians. But as anthropologists, what was their position? The whole period of the war produced the most difficult problems in folk-psychology. There were occasions innumerable when thousands of lives and most heavy expenditure of money might have been saved by a greater knowledge of what creates and what damps folk movements in the various races of the world. India, Egypt, Ireland, even our present relations with Italy and America, show only too painfully how difficult we find it to appreciate the psychology of other nations. We shall not surmount these difficulties until anthropologists take a wider view of the material they have to record, and of the task they have before them if they wish to be utile to the State. It is not the physical measurement of native races which is a fundamental feature of anthropometry to-day; it is the psychometry and what I have termed the vigorimetry of white—as well as of dark-skinned men that must become the main subjects of our study.

Some of you may consider that I am overlooking what has been contributed both in this country and elsewhere to the science of folk-psychology. I know at least that Wilhelm Wundt's² great work runs to ten volumes. But I also know that in its 5452 pages there is not a single table of numerical measurements, not a single statement of the *quantitative* association between mental racial characters, nor, indeed, any attempt to show numerically the intensity of association between folk-mentality and folk customs and institutions. It is folk-psychology in the same stage of evolution as present-day sociology is in, or as individual psychology was in before the advent of experimental psychology and the correlational calculus. It is purely descriptive and verbal. I am not denying that many sciences must for a long period still remain in this condition, but at the same time I confess myself a firm disciple of Friar Roger Bacon³ and of Leonardo da Vinci,⁴ and believe that we can really know very little

² Its last volume also bears evidence of the non-judicial mind of the writer, who expresses strong opinions about recent events in the language of the party historian rather than the man of science.

³ He who knows not Mathematics cannot know any other science, and what is more cannot discover his own ignorance or find its proper remedies.

⁴ Nissuna humana investigatione si po dimandare vera scientia s'essa non passa per le mathematiche dimostratione.

about a phenomenon until we can actually measure it and express its relations to other phenomena in quantitative form. Now you will doubtless suggest that sections of folk-psychology like Language, Religion, Law, Art—much that forms the substance of cultural anthropology—are incapable of quantitative treatment. I am not convinced that this standpoint is correct. Take only the first of these sections—*Language*. I am by no means certain that there is not a rich harvest to be reaped by the first man who can give unbroken time and study to the statistical analysis of language. Whether he start with roots or with words to investigate the degree of resemblance in languages of the same family, he is likely, before he has done, to learn a great deal about the relative closeness and order of evolution of cognate tongues, whether those tongues be Aryan or Sudānese. And the methods applicable in the case of language will apply in the same manner to cultural habits and ideas. Strange as the notion may seem at first, there is a wide field in cultural anthropology for the use of those same methods which have revolutionised psychometric technique, to say nothing of their influence on osteometry.

The problems of cultural anthropology are subtle, but so indeed are the problems of anthropometry, and no instrument can be too fine if our analysis is to be final. The day is past when the arithmetic of the kindergarten sufficed for the physical anthropologist; the day is coming when mere verbal discussion will prove inadequate for the cultural anthropologist.

I do not say this merely in the controversial spirit. I say it because I want to find a remedy for the present state of affairs. I want to see the full recognition of anthropology as a leading science by the State. I want to see the recognition of anthropology by our manufacturers and commercial men, for it should be at least as important to them as chemistry or physics—the foundations of the Anthropological Institutes with their museums and professors in Hamburg and Frankfurt, have not yet found their parallels in commercial centres here. I want to see a fuller recognition of anthropology in our great scientific societies, both in their choice of members and in the memoirs published. If their doors are being opened to psychology under its new technique, may not anthropology also seek for fuller recognition?

It appears to me that if we are to place anthropology in its true position as the queen of the sciences, we must work shoulder to shoulder and work without intermittence in the following directions: anthropologists must not cease:

(i) To insist that our recorded material shall be such that it is at present or likely in the near future to be utile to the State, using the word 'State' in its amplest sense.

(ii) To insist that there shall be institutes of anthropology, each with a full staff of qualified professors, whose whole energy and time shall be devoted to the teaching of and research in anthropology, ethnology and prehistory. At least three of our chief universities should be provided with such institutes.

(iii) To insist that our technique shall not consist in the mere statement of opinion on the facts observed, but shall follow, if possible

with greater insight, the methods which are coming into use in epidemiology and psychology.

I should like to enlarge a little further on these three insistencies, the fundamental 'planks' of the campaign I have in view.

(i) *Insistence on the Nature of the Material to be dealt with.*

I have already tried to indicate that the problems before us to-day, the grave problems that are pressing on us with regard to the future, cannot be solved by the old material and by the old methods. We have to make anthropology a wise counsellor of the State, and this means a counsellor in political matters, in commercial matters, and in social matters.

The Governments of Europe have had military advisers, financial advisers, transport and food experts in their service, but they have not had ethnological advisers; there have been no highly trained anthropologists at their command. You have only to study the Peace of Versailles to see that it is ethnologically unsound and cannot be permanent. It is no good asking why our well-meaning rulers did not consult our well-meaning anthropologists. I for one confess that we have not in the past dealt with actuality, or if we did deal with actuality, we have not treated it in a manner likely to impress either the executive or the public at large. There lacked far too largely the scientific attitude and the fundamental specialist training. I will not go so far as to say that, if the science of man had been developed to the extent of physical science in all European countries, and had then had its due authority recognised, there would have been no war, but I will venture to say that the war would have been of a different character, and we should not have felt that the fate of European society and of European culture hung in the balance, as at this moment they certainly do.

No one can allow individual inspiration to-day, and you may justly cry a Daniel has no right to issue judgment from the high seat of the feast. Daniel's business is that of the outsider, the stranger, the unwelcome person interpreting, probably his own, scrawling on the wall.

Well, if it be hard to learn from friends, let us at least study impassionately from our late foes. Some of my audience may have read the recent manifesto of the German anthropologists, their clarion cry for a new and stronger position of the science of man in academic studies. But the manifesto may have escaped some, and so closely does it fit the state of affairs here that I venture to quote certain portions of it. After reciting the sparsity of chairs for the study of physical and cultural anthropology in the German universities and how little academic weight has been given to such studies, it continues: 'Where these sciences have otherwise found recognition in the universities, they are not represented by specialists, so that anthropology is provided for by the anatomists, ethnology by the geographers, and prehistory by Germanists, archaeologists and geologists, and this although, in the present extent of these three sciences, the real command of each one of them demands the complete working powers of an individual. This want

of teaching posts had made itself felt long before the war, so that the number of specialists and of those interested in our science has receded.' ⁵

And again:

'During the war we have often experienced how in political pamphlets ethnology and ethnography—even as in the peace treaty of Brest-Litovsk—were used too often as catchwords without their users being clear about the ideas those words convey. The sad results of our foreign policy, the collapse of all our calculations as to national frames of mind, were based in no small degree on ethnographic ignorance; one has only to take for example the case of the Turks. Ethnology should not embrace only the spears and clubs of the savages, but also the psychology and demography of the white races, the European peoples. At this very moment, when the right of self-determination has become a foremost question of the day, the scientific determination of the boundaries of a people and its lands has become a task of the first importance. But our Government of the past knew nothing of the activity of the ethnologists, and the Universities were not in the condition to come to their aid, for ethnological chairs and institutes were wanting. The foundation of such must be the task of the immediate future.' ⁶

And once more:

'The problems of the military fitness of our people, of the physical constitution of the various social classes, of the influence of the social and material environment upon them, the problems of the biological grounds for the fall in the birth-rate and its results, of the racial composition of our people, of the eventual racial differences and the accompanying diverse mental capacities of the individual strata, and finally the racial changes which may take place in a folk under the influences of civilisation, and the bearing of all these matters on the fate of a nation, these are problems which can alone be investigated and brought nearer to solution by anthropology. Even now after the war population-problems stand in the forefront of interest, the question of folk-increase and of the falling birth-rate is the vital question of the future.' ⁷

I must ask your pardon for quoting so much, but it seems so strongly to point the moral of my tale. If you will study what Germany is feeling and thinking to-day do not hope to find it in the newspaper reports, seek it elsewhere in personal communication or in German writings. Then, I think, you will agree with me that rightly or wrongly there is a conviction spreading in Germany that the war arose and that the war was lost because a nation of professed thinkers had studied all sciences, but had omitted to study aptly the science of man. And in a certain sense that is an absolutely correct conviction, for if the science of man stood where we may hope it will stand in the dim and distant future, man would from the past and the surrounding present have some grasp of future evolution, and so have a greater chance of guiding its controllable factors.

⁵ *Correspondenz Blatt*, u.s.w., Jahrg. L. S. 37.

⁶ *Ibid.* S. 41.

⁷ *Ibid.* S. 38.

We are far indeed from that to-day; but it befits us none the less to study what this new anthropological movement in Germany connotes. It means that the material of anthropology is going to change, or rather that its observations will be extended into a study of the mental as well as the physical characters, and these of the white races as well as of the dark. It means that anthropologists will not only study individual psychology, but folk-psychology. It means—and this is directly said—that Germany, having lost her colonies, will still maintain her trade by aid of consuls, missionaries, traders, travellers, and others trained academically to understand both savage and civilised peoples. This is a perfectly fair field, and if the game be played squarely can solely lead to increased human sympathy, and we shall only have ourselves to blame if other nations are before us in their anthropological knowledge and its practical applications. The first condition for State support is that we show our science to be utile by turning to the problems of racial efficiency, of race-psychology, and to all those tasks that Galton described as the first duty of a nation—‘in short, to make every individual efficient both through Nature and by Nurture.’

Does this mean that we are to turn our backs on the past, to desert all our prehistoric studies and to make anthropology the servant of sanitation and commerce? Not in the least; if you think this is my doctrine I have indeed failed to make myself even roughly clear to-day. Such teaching is wholly opposed to my view of the function of science. I feel quite convinced that you cannot understand man of to-day, savage or civilised, his body or his mind, unless you know his past evolution, unless you have studied fully all the scanty evidence we have of the stages of his ascent. I should like to illustrate this by an incident which came recently to my notice, because it may indicate to some of those present the difficulties with which the anthropologist has to contend to avoid misunderstanding.

Looking into the ancestry of man and tracing him backward to a being who was not man and was not ape, had this prot-simio-human, in the light of our present knowledge, more resemblance to the gibbon or to the chimpanzee as we know them to-day? Some naturalists link man up to the apes by a gibbonlike form, others by a troglodyte type of ancestor. Some would make a push to do without either. But granted the alternative, which is the more probable? This is the problem of the hylobatic or the troglodyte origin of man. I had given a lecture on the subject, confining my arguments solely to characters of the thigh-bone. Now there chanced to be a statesman present, a man who has had large responsibilities in the government of many races. I have been honoured by seeing his comments on my lecture. ‘I am not,’ he says, ‘particularly interested in the descent of man. I do not believe much in heredity, and this scientific pursuit of the dead bones of the past does not seem to me a very useful way of spending life. I am accustomed to this mode of study; learned volumes have been written in Sanscrit to explain the conjunction of the two vowels “a” and “u.” It is very learned, very ingenious, but not very helpful. . . . I am not concerned with my genealogy so much as with my future. Our intellects can be more advantageously employed than in

finding our diversity from the ape . . . There may be no spirit, no soul: there is no proof of their existence. If that is so, let us do away with shams and live like animals. If, on the other hand, there is a soul to be looked after, let us all strain our nerves to the task; there is no use in digging into the sands of time for the skeletons of the past: build your man for the future.'

What is the reply of anthropology to this indictment of the statesman? You cannot brush it lightly aside. It is the statement of a good man and a strong man who is willing to spend his life in the service of his fellows. He sees us handling fossils and potsherds and cannot perceive the social utility of our studies. He does not believe any enthusiasm for human progress can lie beneath the spade and callipers of the scientific investigator. He has never grasped that the man of to-day is precisely what heredity and his genealogy, his past history and his prehistory, have made him. He does not recognise that it is impossible to build your man for the future until you have studied the origin of his physical and mental constitution. Whence did he draw his good and evil characteristics—are they the product of his nature or his nurture? Man has not a plastic mind and body which the enthusiastic reformer can at will mould to the model of his golden age ideals. He has taken thousands of years to grow into what he is, and only by like processes of evolution—intensified and speeded up, if we work consciously and with full knowledge of the past—can we build his future.

It *does* matter in regard to the gravest problems before mankind to-day whether our ancestry was hylobatic or troglodyte. For five years the whole world has been a stage for brutality and violence. We have seen a large part of the youth who were best fitted mentally and physically to be parents of future generations perish throughout Europe: the dysgenic effect of this slaughter will show itself each twenty to twenty-five years for centuries to come in the census returns of half the countries of the world. Science undertook work which national feeling bid it do, but on which it will ever look back with a shuddering feeling of distaste, an uneasy consciousness of having soiled its hands. And as aftermath we see in almost every land an orgy of violent crime, a sense of lost security, and at times we dread that our very civilisation may perish owing to the weakening of the social ties, a deadening of the responsibilities of class to class. This outbreak of violence which has so appalled the thinking world, is it the sporadic appearance of an innate passion for the raw and brutal in mankind, or is it the outcome of economic causes forcing the nations of the world to the combat for limited food and material supplies? I wish we could attribute it to the latter source, for then we could eradicate the spirit of violence by changing environmental conditions. But if the spirit of violence be innate in man, if there be times when he not only sees red but rejoices in it—and that was the strong impression I formed when I crossed Germany on August 1, 1914—then outbreaks of violence will not cease till troglodyte mentality is bred out of man. That is why the question of troglodyte or hylobatic ancestry is not a pursuit of dead bones. It is a vital problem on which turns much of folk-psychology. It is a

problem utile to the State, in that it throws light on whether nature or nurture is the more likely to build up man's future—and save him from the recurrence of such another quinquennium.

The critic to whom I have referred was not idle in his criticism. He had not been taught that evolutionary doctrine has its bearings on practical life. The biologist and the anthropologist are at fault; they have too often omitted to show that their problems have a very close relation to those of the statesman and the social reformer, and that the problems of the latter cannot be solved without a true insight into man's past, without a knowledge of the laws of heredity, and without a due appreciation of the causes which underlie great folk-movements.

(ii) *Insistence on Institutes of Anthropology.*

The anthropological problems of the present day are so numerous and so pressing that we can afford to select those of the greatest utility. Indeed, the three university institutes of anthropology I have suggested would have to specialise and then work hard to keep abreast of the problems which will crowd upon them. One might take the European races, another Asia and the Pacific, and a third Africa. America in anthropology can well look after itself. In each case we need something on the scale of the Paris Ecole d'Anthropologie, with its seventeen professors and teachers, with its museums and journals. But we want something else—a new conception of the range of problems to be dealt with and a new technique. From such schools would pass out men with academic training fit to become officials, diplomatic agents, teachers, missionaries, and traders in Europe, in Asia, or in Africa, men with intelligent appreciation of and sympathy with the races among whom they proposed to work.

But this extra-state work, important as it is, is hardly comparable in magnitude with the intra-state work which lies ready to hand for the anthropological laboratory that has the will, the staff, and the equipment to take it up efficiently. In the present condition of affairs it is only too likely that much of this work, being psychometric, will fall into the hands of the psychologist, whereas it is essentially the fitting work of the anthropologist, who should come to the task, if fitly trained, with a knowledge of comparative material and of the past history, mental and physical, of mankind, on which his present faculties so largely depend. The danger has arisen because the anthropometer has forgotten that it is as much his duty to measure the human mind as it is his duty to measure the human body, and that it is as much his duty to measure the functional activities of the human body—its dynamical characters—as its statical characters. By dynamical characters I understand such qualities as resistance to fatigue, facility in physical and mental tasks, immunity to disease, excitability under stimuli, and many kindred properties. If you tell me that we are here trenching on the field of psychology and medicine, I reply: Certainly; you do not suppose that any form of investigation which deals with man—body or mind—is to be omitted from the science of man? If you do you have failed to grasp why anthropology is the queen of the sciences. The University anthropological institute of the future will

have attached to it a psychologist, a medical officer, and a biologist. They are essential portions of its requisite staff, but this is a very different matter from lopping off large and important branches of its fitting studies, to lie neglected on the ground, or to be dragged away, as dead wood, to be hewn and shapen for other purposes by scientific colleagues in other institutes. Remember that I am emphasising that side of anthropology which studies man in the service of the State—anthropology as a *utile science*—and that this is the only ground on which anthropology can appeal for support and sympathy from State, from municipality, and from private donors. You will notice that I lay stress on the association of the anthropological institute with the university, and the reasons for this are manifold. In the first place, every science is stimulated by contact with the workers in allied sciences; in the second place, the institute must be a teaching as well as a researching body, and it can only do this effectively in association with an academic centre—a centre from which to draw its students and to recruit its staff. In the third place, a great university provides a wide field for anthropometric studies in its students and its staff. And the advantages are mutual. It is not of much service to hand a student a card containing his stature, his weight, his eye colour, and his head length! Most of these he can find out for himself! But it is of importance to him to know something of how his eye, heart, and respiration function; it is of importance to him to know the general character of his mental qualities, and how they are associated with the rapidity and steadiness of muscular responses. Knowledge on these points may lead him to a fit choice of a career, or at any rate save him from a thoroughly bad choice.

In the course of my life I have often received inquiries from schoolmasters of the following kind: We are setting up a school anthropometric laboratory, and we propose to measure stature, weight, height sitting, &c. Can you suggest anything else we should measure?

My invariable reply is: Don't start measuring anything at all until you have settled the problems you wish to answer, and then just measure the characters in an adequate number of your boys, which will enable you to solve those problems. Use your school as a laboratory, not as a weighhouse.

And I might add, if I were not in dread of giving offence: And most certainly do not measure anything at all if you have *no* problem to solve, for unless you have you cannot have the true spirit of the anthropologist, and you will merely increase that material up and down in the schools of the country which nobody is turning to any real use.

Which of us, who is a parent, has not felt the grave responsibility of advising a child on the choice of a profession? We have before us, perhaps, a few meagre examination results, an indefinite knowledge of the self-chosen occupations of the child, and perhaps some regard to the past experience of the family or clan. Possibly we say John is good with his hands and does not care for lessons; therefore he should be an engineer. That may be a correct judgment if we understand by engineer, the engine-driver or mechanic. It is not true if we think of the builders of Forth Bridges and Assuan Dams. Such men work

with the head and not the hand. One of the functions of the anthropological laboratory of a great university, one of the functions of a school anthropometric laboratory, should be to measure those physical and mental characters and their inter-relations upon which a man's success in a given career so much depends. Its function should be to guide youth in the choice of a calling, and in the case of a school to enable the headmaster to know something of the real nature of individual boys, so that that much-tried man does not feel compelled to hide his ignorance by cabalistic utterances when parents question him on what their son is fitted for.

Wide, however, as is the anthropometric material in our universities and public schools, it touches only a section of the population. The modern anthropologist has to go further; he has to enter the doors of the primary schools; he has to study the general population in all its castes, its craftsmen, and its sedentary workers. Anthropology has to be useful to commerce and to the State, not only in association with foreign races, but still more in the selection of the right men and women for the staff of factory, mine, office, and transport. The selection of workmen to-day by what is too often a rough trial and discharge method is one of the wasteful factors of production. Few employers even ask what trades parents and grandparents have followed, nor consider the relation of a man's physique and mentality to his proposed employment. I admit that progress in this direction will be slow, but if the work undertaken in this sense by the anthropologist be well devised, accurate, and comprehensive, the anthropometric laboratory will gradually obtain an assured position in commercial appreciation. As a beginning, the anthropologist by an attractive museum, by popular lectures and demonstrations, should endeavour to create, as Sir Francis Galton did at South Kensington, an anthropometric laboratory frequented by the general population, as well as by the academic class. Thus he will obtain a wider range of material. But the anthropologist, if he is to advance his science and emphasise its services to the State, must pass beyond the university, the school, and the factory. He must study what makes for wastage in our present loosely organised society; he must investigate the material provided by reformatory, prison, asylums for the insane and mentally defective; he must carry his researches into the inebriate home, the sanatorium, and the hospital, side by side with his medical collaborator. Here is endless work for the immediate future, and work in which we are already leagues behind our American colleagues. For them the psychometric and anthropometric laboratory attached to asylum, prison, and reformatory is no startling innovation, to be spoken of with bated breath. It is a recognised institution of the United States to-day, and from such laboratories the 'fieldworkers' pass out, finding out and reporting on the share parentage and environment have had in the production of the abnormal and the diseased, of the anti-social of all kinds. Some of this work is excellent, some indifferent, some perhaps worthless, but this will always be the case in the expansion of new branches of applied science. The training of the workers must be largely of an experimental character, the technique has to be devised as the work develops. Instructors and directors have to be

appointed, who have not been trained *ad hoc*. But this is remedying itself, and if indeed, when we start, we also do not at first limp somewhat lamely along these very paths, it will only be because we have the advantage of American experience.

There is little wonder that in America anthropology is no longer the stepchild of the State. It has demanded its heritage, and shown that it can use it for the public good.

If I have returned to my first insistence that the problems handled by the anthropologist shall be those useful to the State, it is because I have not seen that point insisted upon in this country, and it is because my first insistence, like my third, involves the second for its effectiveness—the establishment in our chief universities of anthropological institutes. As Gustav Schwalbe said of anthropology in 1907—and he was a man who thought before he spoke, and whose death during the war is a loss to anthropologists the whole world over—‘a lasting improvement can only arise if the State recognises that anthropology is a science pre-eminently of value to the State, a science which not only deserves but can demand that chairs shall be officially established for it in every university. . . Only this spread of officially authorised anthropology in all German universities can enable it to fulfil its task, that of training men who, well armed with the weapon of anthropological knowledge, will be able to place their skill at the service of the State, which will ever have need of them in increasing numbers.’⁸

Our universities are not, as in Germany, Government controlled institutions, although such control is yearly increasing. Here we have first to show that we are supporting the State before the State somewhat grudgingly will give its support to us. Hence the immediate aim of the anthropologist should be—not to suggest that the State should *a priori* assist work not yet undertaken, but to do what he can with the limited resources in his power, and when he has shown that what he has achieved is, notwithstanding his limitations, of value to the State, then he is in a position to claim effective support for his science.

I have left myself little time to place fairly before you my third insistence.

(iii) *Insistence on the Adoption of a New Technique.*

What is it that a young man seeks when he enters the university—if we put aside for a moment any social advantages, such as the formation of lifelong friendships associated therewith? He seeks, or ought to seek, training for the mind. He seeks, or ought to seek, an open doorway to a calling which will be of use to himself, and wherein he will take his part, a useful part, in the social organisation of which he finds himself a member. Much as we may all desire it, in the pressure of modern life, it is very difficult for the young man of moderate means to look upon the university training as something apart from his professional training. Men more and more select their academic studies with a view to their professional value. We can no longer combine the senior wranglership with the pursuit of a judgeship; we cannot

⁸ *Correspondenz Blatt*, Jahrg. xxxviii. S. 68.

pass out in the classical tripos and aim at settling down in life as a Harley Street consultant; we cannot take a D.Sc. in chemistry as a preliminary to a journalistic career. It is the faculties which provide professional training that are crowded, and men study nowadays physics or chemistry because they wish to be physicists or chemists, or seek by their knowledge of these sciences to reach commercial posts. Even the very Faculty of Arts runs the danger of becoming a professional school for elementary school teachers. I do not approve this state of affairs; I would merely note its existence. But granted it, what does anthropology offer to the young man who for a moment considers it as a possible academic study? There are no professional posts at present open to him, and few academic posts.⁹ There is little to attract the young man to anthropology as a career. Is its position as a training of mind any stronger? The student knows if he studies physics or chemistry or engineering that he will obtain a knowledge of the principles of observation, of measurement, and of the interpretation of data, which will serve him in good stead whenever he has to deal with phenomena of any kind. But, alas! in anthropology, while he finds many things of surpassing interest, he discovers no generally accepted methods of attacking new problems, *quot homines, tot sententiæ*. The type of man we want in anthropology is precisely the man who now turns to mathematics, to physics, and to astronomy—the man with an exact mind who will not take statements on authority and who believes in testing all things. To such a man anthropometry—in all its branches, craniometry, psychometry, and the wide field in which body and mind are tested together under dynamic conditions—forms a splendid training, *provided* his data and observations are treated as seriously as those of the physicist or astronomer by adequate mathematical analysis. Such a type of man is at once repelled from our science if he finds in its text-books and journals nothing but what has been fitly termed ‘kindergarten arithmetic.’ Why the other day I saw in a paper by a distinguished anthropologist an attempt to analyse how many individual bones he ought to measure. He adopted the simple process of comparing the results he obtained when he took 10, 20, 30 individuals. He was not really wiser at the end of his analysis than at the beginning, though he thought he was. And this, notwithstanding that the whole matter had been thrashed out scientifically by John Bernoulli two centuries ago, and that its solution is a commonplace of physicist and astronomer!

How can we expect the scientific world to take us seriously and to treat anthropology as the equal of other sciences while this state of affairs is possible? What discipline in logical exactness are we offering to academic youth which will compare with that of the older sciences? What claim have we to advise the State until we have introduced a sounder technique and ceased to believe that anthropometry is a science that any man can follow, with or without training? As I have hinted, the problems of anthropology seem to me as subtle as

⁹ In London, for example, there is a reader in physical anthropology who is a teacher in anatomy, and a professorship in ethnology, which for some mysterious reason is included in the faculty of economics and is, I believe, not a full-time appointment.

those of physical astronomy, and we are not going to solve them with rusty weapons, nor solve them at all unless we can persuade the 'brainy boys' of our universities that they are worthy of keen minds. Hence it seems to me that the most fertile training for academic purposes in anthropology is that which starts from anthropometry in its broadest sense, which begins to differentiate caste and class and race, bodily and mental health and disease, by measurement and by the analysis of measurement. Once this sound grounding has been reached the trained mind may advance to ethnology and sociology, to prehistory and the evolution of man. And I shall be surprised if equal accuracy of statement and equal logic of deduction be not then demanded in these fields, and I am more than half convinced, nay, I am certain, that the technique the student will apply in anthropometry can be equally well applied in the wider fields into which he will advance in his later studies. Give anthropology a technique as accurate as that of physics, and it will forge ahead as physics have done, and then anthropologists will take their due place in the world of science and in the service of the State.

Francis Galton has a claim upon the attention of anthropologists which I have not. He has been President of your Institute, and he spoke just thirty-five years ago from the chair I now occupy, pressing on you for the first time the claims of new anthropological methods. In Galton's words: 'Until the phenomena of any branch of knowledge have been submitted to measurement and number it cannot assume the status and dignity of a Science.' Have we not rather forgotten those warning words, and do they not to some extent explain why our universities and learned societies, why the State and statesmen, have turned the cold shoulder on anthropology?

This condition of affairs must not continue; it is good neither for anthropology, nor for the universities, nor for the State if this fundamental science, the science of man, remains in neglect. It will not continue if anthropologists pull together and insist that their problems shall not fail in utility, that their scientific technique shall be up to date, and that anthropological training shall be a reality in our universities—that these shall be fully equipped with museums, with material, with teachers and students.

It is almost as difficult to reform a science as it is to reform a religion; in both cases the would-be reformer will offend the sacrosanct upholders of tradition, who find it hard to discard the faith in which they have been reared. But it seems to me that the difficulties of our time plead loudly for a broadening of the purpose and a sharpening of the weapons of anthropology. If we elect to stand where we have done a new science will respond to the needs of State and Society; it will spring from medicine and psychology, it will be the poorer in that it knows little of man's development, little of his history or prehistory. But it will devote itself to the urgent problems of the day. The future lies with the nation that most truly plans for the future, that studies most accurately the factors which will improve the racial qualities of future generations either physically or mentally. Is anthropology to lie outside this essential function of the science of

man? If I understand the recent manifesto of the German anthropologists, they are determined it shall not be so. The war is at an end, but the critical time will be with us again, I sadly fear, in twenty to thirty years. How will the States of Europe stand then? It depends to no little extent on how each of them may have cultivated the science of man and applied its teaching to the improvement of national physique and mentality. Let us take care that our nation is not the last in this legitimate rivalry. The organisation of existing human society with a view to its future welfare is the crowning task of the science of man; it needs the keenest-minded investigators, the most stringent technique, and the utmost sympathy from all classes of society itself. Have we, as anthropologists, the courage to face this greatest of all tasks in the light of our knowledge of the past and with our understanding of the folk of to-day? Or shall we assert that anthropology is after all only a small part of the science of man, and retreat to our study of bones and potsherds on the ground that science is to be studied for its own sake and not for the sake of mankind? I do not know what answer you will give to that question, yet I am convinced what the judgment of the future on your answer is certain to be. It will be similar to Wang Yang Ming's reproof of the complacency of the Chinese cultured classes of his day: 'Thought and learning are of little value, if they be not translated into action.'

the science of man and applied its teaching to the improvement of the nation. It is not the least in the least a rivalry. The organization of existing institutions with a view to the future welfare is the crowning task of the science of man; it needs the keenest-minded investigators, the most efficient workers, and the most systematic. From all classes of society, from all ranks of the hierarchy, the courage to face the most difficult of all tasks in the field of our knowledge of the past and present, and the future of the race. (I shall we assert that the science of man is not only a small part of the science of man, and on the ground that science is the science of man, and the science of man is the science of man.)

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